OPERATIONAL SAFETY IMPROVEMENT: THINGS THAT WORK

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ABSTRACT

Researchers at Purdue University have worked closely over the past seven years with several air carriers to explore ways to continuously improve operational safety within their organizations. This experience has demonstrated that isolated initiatives or programs have limited and short-term effects on safety levels. The research suggests that what is needed to produce dramatic and lasting changes in the operational safety of an organization is a systems approach to safety rather than a programmatic one. It has been the researchers' experience that most approaches by air carriers lack several important ingredients for a complete and effective safety system. This article explores several often-missing components to companies' safety strategies.

INTRODUCTION

Over the past several years, researchers have attempted to help industry struggle with ways of improving operational safety without eroding performance and profitability. Many champions of safety strategies and programs within the industry, as well as individual companies, have been encumbered by naysayers hamstrung by the myth that safety improvements only come at the sacrifice of performance and profitability. Over the past several years, researchers at Purdue University have endeavored to work closely with numerous aviation industry partners to identify and refine effective ways to achieve greater operational safety while at the same time maintain or improve performance. The results of these efforts have been not only the development of specific safety improvement tools, such as the "Safety Metric" audit tool, but also the identification of many necessary key elements of an effective systemic approach to improving operational safety within aviation organizations. With the assistance of several aviation industry partners, researchers have demonstrated the effectiveness of this systematic proactive approach at reducing worker injury, improving operational safety and at the same time even improve performance.

A STRATEGY THAT WORKS

Done correctly, safety improvement initiatives should have a lasting effect. Historically, however, such has not been the case for many safety initiatives implemented within aviation companies. It has been the experience of Purdue researchers that these initiatives often fail because the initiatives approach safety improvement from a very narrow perspective. Effective safety strategies are rooted in fundamental and wide reaching changes within the organization. "Band aid" approaches that focus on specific issues without addressing foundational changes within the operational philosophy and structure are doomed to mediocrity and short-lived results at best. In order to effect lasting change and continuing safety improvement, we must approach the development of safety strategies in the same way we address changes in our business

strategies. We wouldn't think of changing our business strategy without first performing a thorough analysis of our current shortcomings and challenges. We would not proceed with changes to our business philosophy without preparing the company for that change. After a thorough analysis and preparation for change, company management would spend time and resources in developing a strategic plan for the new strategy and its implementation. Upper management would insist that this approach is a "no brainer" if we expect the change to have the desired effect and have permanence. Why do we think that safety changes are any different?

While some of the facets of and effective strategy for changing an organization's operational safety performance are specific to the needs of the particular organization, Purdue researchers have found several important elements that were common to all of the industrial partners they have worked with. Not surprisingly, these elements for effective safety change are similar to elements required to effectively make changes in an organization's business strategies. In each case, accurate assessment of the problem, preparation of the organization for change, strategic planning for implementing change, definitive measurement of the effects of implementing the plan, and a system of consistent measurement and feedback for continuous improvement are necessary elements of strategies for lasting change.

Preparation

There are numerous issues which need to be addressed while preparing an organization for change. While the length restriction of this paper does not lend itself to a full rendering of such issues, two often neglected topics are important to mention. It has been the experience of the researchers that many aviation organizations fail to adequately prepare their organizations to support safety changes by establishing an infrastructure to implement and continuously monitor the effects of the strategy. The researchers have also found that in most organizations the safety roles and responsibilities at each level of the organizations are not clearly define.

Establishing an Infrastructure to Support Safety Change

Purdue researchers have long contended that an organization's safety improvement strategy cannot consist of a single program or initiative. Rather, safety improvement efforts must be a part of a systematic and well thought out proactive strategic plan which encompasses not only safety initiatives and programs but also a well constructed infrastructure to support safety as an unwavering organizational goal valued and supported at all levels of the organization. This programmatic approach insures that safety efforts receive the necessary resources, support, and integration into the fabric of the organization necessary to provide for the longevity required to realize results. Organizations need to change their perception of safety as a programmatic effort to safety improvement as a system.

Central to the success of any attempt to develop a culture which will continue to support operational safety is the recognition of the importance of safety and the active support of safety initiatives by all levels within the organization. Extensive research by Purdue University has demonstrated that organizational safety initiatives are often implemented and supported by upper management and highly desired by workers. The research has also shown, however, that too often these initiatives prove ineffective due to communication "disconnects", inadequate resource allocation, or the lack of recognition and/or support by middle management. This has left corporate executives and researchers alike wondering how a comprehensive and cohesive

program of safety initiatives might be structured so that it would truly lead to the development of a safety culture within large aviation organizations.

Purdue researchers in conjunction with their industry partners have developed and tested a strategy that has demonstrated itself to be effective at raising safety awareness and promoting safety advocacy at all levels within a corporation. This safety advocacy structure has demonstrated considerable success at generating positive safety attitudes and reductions in safety issues and error potentials (Eiff, 2001). Dubbed the Safety Action Team (SAT), the strategy utilizes a peer monitoring, mentoring, and adjudication process coupled with a highly diversified communication strategy to insure that problems are reviewed and addressed by representatives from all career fields. Management plays a critical role in the strategy by providing adequate resources and support to insure that problems can be addressed in a timely and effective manner. Central to the SAT strategy are concepts such as peer safety mentoring and adjudication, effective safety concern reporting and feedback, demonstrated management commitment and resource allocation, and unilateral representation.

At the heart of the strategy are dedicated safety representatives on every shift and in each career field. These individuals provide a visible and readily accessible safety advocate in every work area and on all shifts. These safety representatives can receive and discuss individual safety concerns, monitor (even audit) safety in the workplace, and, in many cases, provide immediate action on safety issues. These safety representatives represent general and career specific concerns at the station level by participating in weekly station safety meetings. These weekly meetings provide a forum where all safety representatives can discuss work environment specific and mutual safety concerns, formulate potential solutions, act on solutions, and review the effectiveness of implemented solutions in an on-going, proactive way. These same safety representatives form a "Safety Incident/Event Review Board" to help resolve safety infraction issues and provide safety mentoring for individual workers who have been involved in a safety violation, accident or incident. This structure provides a "peer review" of safety infractions in the spirit of the "substitution test" as proposed by Neil Johnston (Reason, 1997). A key facet of the strategy is its ability to monitor and predict safety and error causing conditions before they generate a safety incident or accident.

Establishing Clear Safety Roles & Responsibilities

A recurring theme through numerous research studies performed by the Purdue research team has been the pervasive lack of clarity of the safety roles and responsibilities for each individual within the context of daily work and operational environments. There seems to be a general expectation within most organizations that each individual intrinsically knows their safety responsibilities and the role they play in promoting a safe workplace. Unfortunately, Purdue research has demonstrated that this is not the case. While frontline workers have a general perception that they must perform their duties in a safe fashion, they are not solely responsible for safety, as many managers seem to believe. Many of the workers and managers interviewed by Purdue researchers indicated some level of confusion about their roles and responsibilities for promoting safety within the workplace. This was especially true of middle and frontline managers.

Most corporations include phrases in frontline worker job descriptions or promote posters in work environments that emphasized the expectation that frontline workers will perform their duties in the safest possible manner and will do everything they can to ensure operational safety. Unfortunately, stated in such broad and ambiguous terms, each worker is left to his or her own interpretation of the meaning of the term "safest" and unsure of their span of control and the

boundaries of their powers to make changes in their work environment and to influence other workers. Lacking in both power base and resources, workers are most often left with only "creative" ways to promote or ensure safety in their workplaces. Many times workers become frustrated by their apparent inability to affect work setting safety levels and take little action to ensure their personal safety or the safety of others.

When researchers evaluated each organization's job descriptions for managers, they found most companies provided little insight into the critical roles and responsibilities of managers (Eiff, 2000). Most often, companies gave only cursory treatment to these roles with such general phrases as the manager will "provide for the safety of workers", "promote safety in the workplace" or "ensure a safe work environment." Delving deep into the issue, researchers evaluated training managers received to determine if they received any training in how to promote safety or safety accountability in their work environments. An evaluation of materials and programs utilized by the organizations to prepare managers to assume their new positions found them devoid of material for defining their new safety roles and responsibilities, exploring safety techniques or processes, or preparing them to monitor and trend workplace safety levels. In fact, it was found that in most cases managers did not even have the rudimentary human factors and safety training provided to many frontline workers.

Not surprisingly, the researchers found that most work settings suffered from a generalized lack of focus on safety as a workplace value and a frustration among workers about the support given to resolving safety issues and developing and implementing safety programs and training. They also expressed extreme frustration about the lack of proper and fair safety accountability. All of these factors lead to a devaluation of safety as a workplace focus and the belief that safety was a distant second to performance goals and outcomes.

Analysis

When working with industry partners on troublesome safety and error problems, researchers always begin by analyzing the historic data related to the issues in question. One of the principal focuses of this analysis centers around potential "error forcing" conditions in the workplace which make workers more likely to commit errors or cause undesirable outcomes like accidents, incidents, and injuries. Operational pressures and work/productivity related goals often define an environment where errors and accidents are more likely to occur. Human error research classifies such error forcing conditions into three general categories, latent errors, general failure types, and organizational factors. These conditions can individually or collectively put workers at risk of making greater numbers of errors that can not only lead to accidents, incidents, or injuries, but can also dramatically affect productivity. Purdue researchers have noted throughout numerous research projects that safety problems are often driven by poor work processes.

Work related errors not only produce safety problems but also manifest themselves as operational problems such as delays, cancellations, aircraft damage, and other conditions that affect productivity and profitability. It should be evident that ferreting out work environment and process related conditions which encourage error generation would improve safety while also providing for greater productivity. Researchers often found deficiencies in company policies or procedures are at the root of many safety and productivity related problems.

While close attention was always given to such issues during the analysis of historic accident and incident data, researchers often found that a critical and systematic assessment of

the organization's daily operation often provided the greatest insight into work related issues which resulted in degradation of both safety and productivity. The challenge confronting Purdue researchers in these investigations was to find a way to effectively assess work-related problems and convey the importance of developing a strategic approach to managing daily operations. Researchers recognized that to realize this goal they would have to utilize an analysis process that would not only effectively identify many sources of operational problems, but also focus on examining the interdependency of workgroups in such a way that each workgroup would understand their role in the efficient and timely attainment of their organization's ultimate operational safety goals. There are many tools that an organization might utilize for such an assessment. Purdue researchers have chosen a common analysis process that maps and assesses workflow and processes. This strategy is used commonly in manufacturing environments and is often referred to as "work-process" or "value stream" mapping. The researchers built their research protocol on process analysis techniques that had proven highly successful in other work settings and industries. Principle among these tools was the mapping of work process using the American National Standards Institute (ANSI) process mapping strategy (Harrington, 1991). This technique had proven highly effective in manufacturing settings in defining effective work flow, barriers to effective task articulation, and bottlenecks in both process and product throughput. Developing a comprehensive map of the flow of the product through the operational process, defining and clarifying each process step, and clearly identifying critical points of workgroup task coordination and communication was pivotal to assessing operational problems. The map served the further purpose of providing a clear view of the "big picture" for individual workgroups. In this way, the map offered a way for individuals or workgroups to locate themselves within the web of interrelated and interacting activities that were required in order to carry out work processes, as well as identifying the critical junctures within the work process when their actions impacted and were impacted upon by the activities of other groups. This provided much needed insight into how each group's contribution was critical to other workgroups' processes, as well as to the completion of fundamental operational objectives.

Utilizing this approach, Purdue researchers focused on the flow of the product (passengers, baggage, etc.) and defined each step performed by workers in each career field. Once the process was mapped, the technique was used to identify critical points where worker coordination or communication across career fields or workgroups must occur to safely and efficiently move the product through the process. The map was also used to define work areas or tasks that expose workers to risk or have a significant potential for producing errors or undesirable outcomes. Efficient work throughput was also analyzed in order to identify points in the operation where productivity challenges may result in operational pressure to cut corners or neglect to follow safety procedures. Once established, the map becomes a focal point for discussion among managers, workers, and researchers when assessing or strategizing work process and safety improvements.

Operational analysis of each of the carriers the researchers work with demonstrated several general contributors to both safety- and productivity-related operational problems. In each case, the researchers determined that poor inter-workgroup coordination and communication played central roles in the operational problems being experienced by the carrier. In particular, the common thread of poor communication of critical information was a significant feature causing or contributing to the greater percentage of operational problems. While focus group discussions, interviews and questionnaires provided some insight into the perceived causes of ineffective communication within these work settings, researchers were unable to define and

isolate many of the most salient causes of poor communication armed only with the insight of airline professionals. Researchers soon became reliant on the process mapping strategy as the primary technique for identifying, analyzing and tracking critical communication needs within the airlines' operations

Using this technique, Purdue researchers have been very successful at promoting not only dramatic improvements in safety but also significant improvements in work process and flow that have resulted in increases in productivity and profitability. In one case, an assessment of the shift-turnover process for a major airline at one of its heavy maintenance facilities resulted in not only dramatic improvements in safety but also reduced the heavy maintenance cycle-time of their aircraft by one full day. The improved process also reduced double-ordered parts, task rework, test-flight, charge-back, and quality assurance write-ups. Company officials reported that the reduced cycle time and rework alone resulted in a savings of between $140,000 – 160,000 per aircraft.

Doing a Better Job of Measuring Safety

The crucible within which effective solutions to safety and productivity problems are forged is the comprehensive and fastidious assessment of operational parameters and activities in search of the problems' seminal origins. Many common methods of analysis utilized by industry managers and researchers alike have proven less than comprehensive and effective at identifying sources of poor safety performance. To a large extent, the industry partners who worked closely with Purdue researchers had little in the way of effective safety monitoring and tracking metrics. Several had made attempts at collecting safety related data but these approaches often amounted to little more than accumulating raw numbers on the number of safety related events which had occurred. In all cases, little effort was made to identify and evaluate elemental causes for the events or error forcing factors within the operational work environment or processes. All of the data collection processes experienced by the researchers lacked several important attributes to make them effective for safety level assessment or tracking and trending for continuous improvement.

Accurate data collection is fundamental to the longevity of any safety initiative. Without it, safety advocates would be left defenseless in proving gains in safety performance and in justifying the expenditure of resources in support of such efforts. The first step in any effective assessment of improvement in the safety performance of an operation or the financial benefits of safety initiatives and programs is the structuring of an accurate way to assess the direct and related costs of errors, incidents and mishaps. Without this baseline, efforts to measure programmatic or training benefits would be meaningless. Throughout their efforts to assist industry partners promote more effective and efficient safety management strategies, Purdue researchers have noted that none of the organizations dealt with measure and trend operational safety levels and the real costs of incidents, injuries, and mishaps effectively.

While most organizations the researchers worked with had safety measurement strategies, none could adequately relate the organization's current level of operational safety. The reason for this is two-fold. All of the organizations utilized safety metrics that were "reactive" measures of safety, that is, accidents, incidents, or near-miss events had to take place before the event was noted, recorded, or evaluated. Unfortunately an event's outcome, whether it results in an accident, incident, injury, near miss, or goes completely unmanifested or undetected, has more to

do with chance than anything else. Thus, the relationship between a worker's unsafe act and a measurable "bad outcome" is most often serendipitous.

Additionally, none of the organizations had started their safety metric strategies with a plan centered on a well-defined goal. While many professed that the purpose or goal of the safety measurement was to prevent future errors, in actuality, the measurements did little beyond providing summative assessments of the numbers of events which had occurred during a given period of time. Little energy was expended at assessing error causation, latent conditions, organizational factors or unsafe behaviors. Without this important information, little can be done in designing effective safety strategies and interventions.

Recognizing the need for a more effective method of monitoring and trending daily operational safety, Purdue researchers, worked with industry partners to design and perfect a safety metric tool aimed at the "real-time" assessment of worker unsafe behaviors and operational safety levels. With support from the Federal Aviation Administration, a technique was developed which identifies the most common risky behaviors performed by workers in various work groups. Working with industry partner representatives, Purdue researchers developed a checklist for scoring daily behaviors and a computer program which tallies and graphs the most common worker unsafe behaviors as well as their root causes. This information is presented weekly to managers and provides them with a better understanding of the types of behaviors being performed by workers in their areas of responsibility that often lead to bad outcomes. Armed with this knowledge, managers could alert workers to risky behaviors, correct unsafe conditions, monitor the work environment for unsafe acts, and modify worker behaviors to safer actions.

This tool has proven very successful at defining heightened error potentials and predicting future accidents and incidents. One organization using the tool identified over two hundred potential safety problems during a six-month trial period and successfully intervened to prevent costly outcomes in all but a few of those cases. The tool also accurately predicted nine accidents and safety events during the same period which resulted from missed opportunities to intervene despite being identified and reported by the Safety Metric tool. Importantly, the strategy requires a minimal investment in capitol assets or training and results in highly visible, pragmatic and effective results. Safety measurement strategies such as this technique are the foundation upon which safety managers can accurately measure improvements from safety programs and initiatives.

Changing Worker Behaviors

Developing a strategy which adequately prepares the organization for changes in safety performance, analyzes historic and current safety problems, and accurately measures, monitors, and trends operational safety levels is not enough to effectively and efficiently reduce safety related problems. Changes in safety performance can only be realized if the mechanism of error that produced the event is understood and prevented. It is estimated that between 85-95% of all accidents, incidents and injuries are the result of worker's unsafe behaviors. It should be obvious, therefore, that changing worker's unsafe behaviors must be central to any lasting safety initiative or program.

During our studies, Purdue researchers generally observed that most companies fail to consider a systematic means of monitoring and changing worker actions and provide little preparation for their frontline managers on how to effectively change workers' behaviors. In

most organizations, approaches to changing workers' undesirable behaviors were often limited to threats, intimidation, and discipline. Some companies enthusiastically venture into the quagmire of incentive and reward programs in the belief that money and gifts are a more effective way to change worker behaviors. Research suggests that such programs are frequently ill conceived and often counterproductive. Take, for example, the common practice of rewarding a work group for x-hours of injury free performance or x-months of activity without any aircraft damage. The closer the group gets to the designated reward point the greater the pressure on each individual to not report small injuries or to hide damage which would probably go undiscovered or could be passed-off to another work group or station. This often hides important accident and incident causation and exposes workers and operations to expanded risks.

What surprised the researchers was that none of the organizations they worked with were familiar with or had considered using scientifically proven techniques such as behavior shaping. Based on Skinner's research in psychology, behavior shaping has become the foundation of many highly effective safety strategies and programs such as the DuPont "STOP" program and the widely used strategy of "Behavioral Based Safety" (BBS) (McSween, 1995, Krause, 1997, Geller, 2000). The strategy is relatively simple to understand and use and the technique has as its core components many of the attributes found missing in the organizations being studied. Another important factor that makes it very attractive when considering the return on investment of safety initiatives is that the cost of implementing such a program is low, it is proven to be effective, and the technique is equally as effective at promoting productivity improvements as it is engendering safety (Braksick, 2000). This fact can be used by safety program advocates who constantly struggle to convince managers that instituting safety initiatives does not have to be at the sacrifice of worker productivity.

Fundamentally, the technique revolves around a model commonly referred to as the ABC model. The **ABC**s stand for Antecedent, Behavior and Consequences. The strategy promotes the clear communication of the desired and expected behavior (the **A**ntecedent to the behavior), the monitoring of worker **B**ehavior to see how well it matches the desired behavior, and a direct **C**onsequence for their behavior in the form of positive or corrective feedback. Research has demonstrated that if **A**ntecedents are clearly stated (clearly communicating expectations), Behaviors are closely monitored (measuring and tracking unsafe acts), and **C**onsequences are certain (consistency of treatment), immediate, and constructive (positive as well as corrective) that the impact on worker performance and behaviors is dramatic. The experience of the researchers demonstrated that these attributes do not generally exist in aviation operational environments. Clearly, companies and their frontline managers could benefit from techniques such as behavior shaping that have a low cost of implementation, are proven effective, and promote productivity as well as safety in the operation.

Safety vs. Productivity

The value of a safety management systems approach rather than a programmatic approach to safety is that system elements provide the basic strategies and measurements necessary to demonstrate the efforts value and even its impact on operational performance. Purdue researchers have long contended that safety improvements do not have to come at the expense of operational performance. In fact, in many studies, researchers have demonstrated conclusively that safety improvements often come hand-in-hand with productivity improvements. As an illustration of this contention, consider the following case study that

examines the researchers' recent experience while performing operational safety improvements with one of our industry partners.

Positive Bag Match – A Case Study

Although many examples of the complementary nature of safety and operational process analysis and improvement could be utilized to illustrate the effectiveness of the methodology outline above, the author chose to use a recent research project which is both timely and rich in representative problems involved in air carrier operations. The research team had completed several safety related projects for the industry partner utilizing the ANSI process mapping technique and Safety Metric that had proven to be extremely effective. The company asked researchers if they could use the same technique to analyze and track operational performance. Confident that the technique would work well in such an application, researchers challenged the company to come up with a project as a test for the technique's effectiveness in performance analysis and improvement. The industry partner indicated that one of its stations was experiencing a chronic problem with its international flights' "on-time performance". For over a year, the performance for these flights had been consistently less that 24% on-time in departures.

Research team members began their assessment by reviewing the data on the station's international performance for the last two years. This provided insight into what the company attributed the delay to for each flight. The research team then visited the station and job-shadowed frontline employees in all career fields involved in the operation. After three days of observation, the team identified five major issues that contributed to the problem. The leading contributor to the failure of over 90% of the flights was delays in matching passengers with their bags prior to departure as required by Federal Aviation Regulations. Closer examination of the problem disclosed that missed communication and the lack of coordination between the various workgroups involved in the process precipitated the removal and loading of bags unnecessarily and failed to provide adequate information for proactive intervention to produce the timely processing of baggage.

After the team's initial assessment, researchers gained the support of the industry partner in identifying knowledgeable frontline workers and managers from all of the career fields involved in the bag matching process. At the industry partner's invitation, many of these individuals volunteered to work with the research team to analyze and refine the process. These individuals were released from their normal duties for two weeks in order to meet with the research team and work on the problem.

Purdue researchers began their activity with the employees by providing company representatives with an overview of the process mapping strategy and analysis technique. Once the representatives understood the philosophy behind the effort, researchers taught the employees the rudiments of how to construct an ANSI process map. Armed with this knowledge, the employees were divided into their various career fields and moved to separate rooms. Purdue researches then worked with the employees to construct a map of the process each career field performed during international flights to match passengers and their bags. After the various groups had constructed and agreed upon the accuracy of their maps, the whole group was reconvened. Once the group was back together, each career field presented and explained their process map. The total number of steps performed by the various career fields to complete the bag matching process was one hundred and nineteen steps.

The first thing that became apparent to the whole project team during the presentations was that there were a lot of redundant steps between the groups. This surprised the employee representatives and lead to long discussions to discover why these duplications existed. In all cases, the career fields represented in the duplication were unaware that the other group was performing that particular step. The employees explored various ways to eliminate duplicate steps and negotiated which group was the most appropriate to perform the task. Most often this led also to a call for assurances by the other career field affected for clear communication of the status and information involved in the task under scrutiny in order to meet their operational needs.

Another issue which presented itself was that several of the career fields performed redundant steps because they felt they "could not trust" the other group to perform the function in an accurate and timely manner. This shocked the other group involved and led to animated discussions concerning this apparent mistrust. In the final analysis of each case, the issue was poor communication and/or coordination between the groups rather than the inability of the group to perform the task well or in a timely way.

During an all day session, the aggregate group worked to integrate the various process maps into one operational map that met the operational needs of the company and each individual workgroup. The result was a much more streamlined process of fifty-six steps. During the process of defining this new operational strategy, the groups learned a great deal about the interdependency of the various career fields upon each other and the importance of timely and effective communication between the workgroups. As a result, each workgroup came away with a clearer understanding of their roles and responsibility and of points of critical communication within the process.

Once the holistic map of the process had been agreed upon, the project team focused on nuances of implementing and testing the strategy. This included identifying critical performance behaviors of each of the individuals in the process. As in the case with the Safety Metric tool, these critical performance behaviors were defined and recorded on an observational checklist for use by coaches to monitor and correct behaviors that did not effectively support the process. The newly defined process was then tested for a two-week period using project team members in critical roles within the process. The result was a dramatic improvement in on-time performance for the station's international flights. At the end of the test period, over ninety-percent of the international flights had departed on time. More importantly, none of the delays had been caused by issues related to matching passengers with their baggage prior to dispatching the aircraft.

CONCLUSION

In order for safety improvement initiatives to be productive in generating and maintaining safety gains for extended periods of time, effective strategies must be defined which prepare an organization for change, precisely assess the problems and their causes, design effective interventions, change worker unsafe behaviors, accurately measure and trend operational safety levels, and make accommodations for continuous feedback and improvement. Over the past six years, Purdue researchers have developed an effective combination of tools and practices that have proven to be highly effective at effecting improvements not only in safety but also in performance and productivity. This combination of activities has demonstrated that it is not only effective but it is easily transferable among various work groups within the same organization as well as among organizational settings. The cost of integration of the strategy into a company's

business fabric is very reasonable and the technique provides a wide range of benefits that can improve both the safety and performance of the organization's operation. With proper preparation of the organization, measured implementation, and longitudinal support of the strategy, organizations will find an effective and lasting system to support their current and future safety and performance needs.

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